Childhood Obesity: The Problem of America's Growing Children

An Honors Thesis (HONR 499)

by

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Abstract

With childhood obesity rates higher than ever, the overall health of the generation is an issue that cannot be ignored. This research paper will present the history of childhood obesity and the prevalence of this epidemic in our society. By identifying the causes and impacts of childhood obesity on children, it is anticipated that the reader might find the motivation needed to help prevent and reduce the incidence among those in their sphere of influence. A variety of options to help prevention and reduce overweight and obesity will be presented, along with the author's recommendations about what action steps could be taken to combat this issue.

The purpose of this paper is to inform the reader about the gravity of the problems associated with childhood obesity and to explain why childhood obesity is such a pressing issue. It will present a variety of information and possible solutions to encourage the reader to take action and to be better informed in making decisions in their own daily life.

Key words: children, obesity, health, education, school, adolescents, nutrition, activity

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Introduction

According to First Lady Michelle Obama, "Nothing is more important than the health and well-being of our children" (Haupt, 2013). First Lady Michelle Obama made this statement during the signing of the Healthy, Hunger Free Kids Act in 2010. Since that time, Mrs. Obama has become one of the most powerful forces fighting against childhood obesity. Mrs. Obama isn't alone in this movement to combat childhood obesity, that, according to Wang, Beydoun, Liang, Caballero, and Kumanyika (2012) is so prevalent that it is called an epidemic. Childhood obesity, barely on the radar 40 years ago, is increasingly becoming one of today's most pressing public health issues (Hippel & Rahas, 2013).

Harrowing statistics and new information are presented to the American public almost daily. In 2004, then Undersecretary for Food, Nutrition and Consumer Services at the United States Department of Agriculture, Eric Bost, reported that the percentage of overweight children had doubled, and the percentage of overweight adolescents has more than tripled, in the previous twenty years (Bost, 2004). At that time Undersecretary Bost suggested that if this trend did not stop, the children in this generation would not live to be as old as their parents.

Ten years have gone by since Undersecretary Bost's disturbing statement, yet today the problem of childhood obesity remains a pressing issue. By identifying when and why the increase in childhood obesity occurred, insight can be gained into the risk factors that must be modified to reduce the consequences and toll that obesity takes on the children of America. The purpose of this paper is to identify the history, prevalence, causes, and impact of childhood obesity, to describe various ways to prevent and reduce the prevalence of childhood obesity, and

to make specific data-driven recommendations on what could be done to address the growing problem of childhood obesity in America's children.

History

The history of childhood obesity is a recent one (Hippel et al., 2013). The National Health Interview Survey, conducted by the National Center for Health Statistics of the Centers for Disease Control and Prevention (CDC), was instituted for the first time in 1960 after being enacted into law in 1957 (CDC, 2013). This survey gave community health specialists and the CDC the first picture of the level of health of the United States including a height and weight statistic for each participant. From the 1960's into the 1980's the rates of childhood obesity remained relatively stable at or below 5% of school aged children and adolescents for 20 years (Hippel et al., 2013). It was in 1980 that,for the first time, rises in the total percentage of this demographic were seen, beginning the trend of the rising levels of obesity in American children (Hippel et al., 2013). This recent and exponential growing of the obesity rates in children demonstrates that it is a condition that remains on the rise (Appendix A).

Prevalence

Childhood obesity is now being described as an epidemic (Wang et al., 2012). According to the CDC, ("Overweight and Obesity," 2013) childhood obesity rates have more than doubled in the last 30 years with rates of obesity among adolescents having more than quadrupled. In 1980, seven percent of children between the ages of 6-11 years, and five percent of adolescents between the ages of 12-19 years were classified as obese. By 2012, these percentages skyrocketed to 18% among children aged 6-11 years and 21% among children aged 12-19 years ("Overweight and Obesity," 2013). In 2011, it was estimated that 15% of the children in Indiana were classified as obese. According to the Delaware County Healthy Living Take Action

Coalition, if the current rate of obesity and overweight continues, nearly 24% of children and adolescents will be overweight or obese by 2015 (Koester, 2010). From these statistics it is clear that from 2012 for the United States and 2011 for Indiana, these predictions may come true.

The prevalence of obesity in children also varies based on factors such as ethnicity and socioeconomic status. The CDC National Health and Nutrition Survey showed that in 2008 rates of obesity were highest among Hispanic boys 6-11 years and non-Hispanic Black girls aged 12-19 (Ogden, 2008). Income also affects obesity among children with the trend being the lower the socioeconomic status the higher the rates of obesity (Ogden, 2008). Additional information about the relationship between ethnicity, income and childhood obesity can be found in Appendices B.1 and B.2).

Causes

The causes of obesity are wide and varied and can be classified as modifiable and non-modifiable (James, Nelson, & Ashwill, 2013). Modifiable risk factors are often difficult to control among children with many associated with parental lifestyle choices. These risk factors promote the gain of weight and increase BMI in children.

Non-modifiable Risk Factors

Genetics play a role in just about everything from our appearance to our overall health, including obesity (James et al., 2013). An inherited gene—called the FTO gene—along with other genetic polymorphisms, are seen in twin studies, adoption studies, and studies of families (Cecil, Dalton, Graham, Blundell, Hetherington, & Palmer, 2012). These variations have been associated with a susceptibility to weight gain and appetite control. Gene mutations cause problems with metabolism, such as hypothyroidism, binge eating disorder, or even problems in the hypothalamus, the center for brain regulation and where the hormone leptin is released that

controls our appetite---without this hormone one never feels satiated leading to hyperphagia. The problems would be a risk factor for childhood obesity, but are relatively uncommon compared to the rate of childhood obesity and make up only five to seven percent of all cases of childhood obesity (Cecil et al., 2012). The FTO gene, "has provided the most robust evidence to date for contribution of common variants in predisposing to polygenic obesity" (Cecil et al., 2012, p.201). Located on chromosome 16, the FTO gene is expressed in the hypothalamus-pituitary-adrenal (HPA) axis and has been found to have an effect on body weight control on satiety regulation. The FTO has a vast evidence base implicating its affect on BMI and obesity rates, but further research is required (Cecil et al., 2012).

Gestational weight gain may also have an effect on childhood obesity and adiposity. Ensenauer, Chmitorz, Riedel, Fenske, Hauner, Nennstiel-Ratzel, & von Kries (2013) analyzed data from almost 7000 mother-child pairs. The results revealed that an excessive weight gain during the gestational period affected the weight of the children not only at birth, but also later on in life. The children of these mothers were found to have higher rates of being overweight or obese as well as having higher abdominal adiposity, the most dangerous area to gain fat.

Modifiable Risk Factors

Though genetic links that have been found to be associated with childhood obesity, the most important factor that drives health and BMI is lifestyle (James et al., 2013). Lifestyle choices of the child may be out of their hands depending on the age, with much of the responsibility of a child's health in the hands of the parents (James et al., 2013).

One major problem associated with childhood obesity is the lack of physical activity. Results of the 2008 Youth Risk Behavior Surveillance System (YRBS) indicated that only 18% of high school students met the guidelines of 60 minutes of physical activity per day and less

than 33% attended a daily physical education class (YRBS), 2009). With most children spending at least 8 hours a day at school, and spending most of it sitting in chairs, it is not a surprise to see that school aged children are not active enough (State Indicator Report, 2010). The CDC estimates that children 8-18 years of age spend 7.5 hours each day with entertainment media such as cell phones, television, video games, etc., while children 6 months to 6 years watch about 1 hour and 57 minutes of television or movies each day (Rideout & Hamil, 2006). This lack of opportunity to be active as well as the distractions that keep children sedentary has led to a decreased amount of physical activity across the board.

An increase in daily caloric intake works hand in hand with lack of physical activity to cause weight gain in children (James et al., 2013). Children spend a majority of time at school, making the school environment a perfect place to establish healthy habits. Unfortunately, up until July 2014, schools continued to offer sugary beverages and unhealthy meal options. At the beginning of the 2013 academic, the Healthy Hunger-Free Kids (HHFK) was implemented in schools to modify the school lunch in an effort to prevent and reduce childhood obesity. Beginning with the 2014 academic year, the Smart Snacks potion of the HHFK will be implemented. This act mandates the removal of sugary beverage and unhealthy snacks from being sold or served in schools and it mandates that schools provide healthy and fresh options (Healthy Hunger-Free Kids Act, 2014)

Outside of school it can be equally as hard for children to receive adequate nutrition. Most households now have two parents working, and while this leads to more income, it also leads to less time to do things such as cooking a healthy dinner (Children's Food Environment, 2011). With the variety of fast options such as McDonald's or frozen pizzas available taking the time to cook a healthy meal has become a rarity (Children's Food Environment, 2011).

According to the Chicago Tribune, 75% of families still eat at least 5 meals a week together, it is just what is on the table that has changed. Portion size increase has also become a problem (McConahy, Smiciklas-Wright, Mitchell, & Picciano, 2004). Without knowing it children, or adults, are eating much more calories in what one would think is one serving than before (McConahy et al., 2004). Appendix C.1 contains a visual depiction of how portion sizes have increased over time.

Access to healthy options may also be limited. Depending on location and socioeconomic status fresh fruits and vegetables, whole grains, and lean protein may not be available (Larson, Story, & Nelson, 2009). Those affected most by this are families that live in rural areas, minority neighborhoods, and low-income areas (Larson et al., 2009). Cost comes into play as well. It can be cheaper to just go to the store and buy a $6 frozen pizza to feed a family of four instead of buying all of the ingredients to cook a healthy dinner (Larson et al., 2009).

Impact

Childhood obesity impacts children in many ways. From the physical effects the weight has on their bodies to social stigmas associated with being obese, these children have more issues to deal with than their peers with normal BMI measurements (James et al., 2013). To fully grasp the weight of the issue and why stopping this problem is so important, one needs to know just how childhood obesity affects America's youth.

Physical Complications

The physical complications that one can have from obesity as an adult are numerous. Children suffer from the same physical complications that adults can when they are obese. A list of these diseases common in obese children includes Type II Diabetes, Asthma, Metabolic

Syndrome, Early Menstruation or Puberty, Hyperlipidemia, Sleep Apnea, and Hypertension (Herouvi, Karanasios, Karayianni, & Karavanaki, 2013). These diseases also increased a child's risk for developing cardiovascular disease both during childhood as well as later on in life (Herouvi et al., 2013). Cardiovascular disease encompasses a variety of disorders including coronary artery disease and myocardial infarction (or heart attack) that make up the number one killer of Americans ((Lewis, Dirksen, Heitkemper, Bucher, &Camera, 2011).

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These chronic diseases alter a child's quality of life (James et al., 2013). Diabetes requires strict diet and blood sugar management with daily finger pricks and possible insulin injections (Lewis et al., 2011). Sleep apnea requires the use of a mask at night to prevent airway obstruction and asthma requires breathing treatments and limited activity options. Many of these diseases also require potent medications with possibly dangerous side effects (Lewis et al., 2011).

Psychosocial Complications

The complications of obesity are not just physical. According to the Kalarchain and Marcus (2012), childhood obesity can be responsible for disorders such as eating disorders low self-esteem or bullying depression, behavior or learning disorders, and anxiety. These authors investigated the incidence of these psychiatric comorbidities and their connection to childhood obesity. They found that disordered eating can be implemented by the child to gain control over their eating or as a way to cope with depression, anxiety, or other emotions. In addition,

depression, anxiety, ADHD, and other behavioral disorders were found to be common among obese children, which could lead to low self-esteem and cause the child to either be a victim of bullying or to bully others to gain back some sense of control. The authors concluded that whether these psychiatric comorbidities are a cause or a consequence of childhood obesity, studies show that they frequently accompany one another.

These psychosocial problems are not very surprisingly linked to childhood obesity. Being overweight or obese has a negative stigma attached to it in the United States (DeJong, 1980). Obesity separates these children from their peer and may prevent them from participating in the same activities such as tag at recess. According to Erikson's theory of Psychosocial Development, school aged children are in the stage of Industry vs. Inferiority (James et al., 2013). If they are not successful in their academic and social endeavors at school this may cause them to feel inferior and continue to cause problems with both self-esteem and social skills.

Prevention and Reduction

Despite the growing issue and being surrounded by conditions that don't promote health and wellness, childhood obesity is highly preventable and reversible (James et al., 2013). Many of the health issues, both physical and mental, that are associated with childhood obesity can also be drastically decreased or eliminated through the reduction of weight (Lewis et al., 2011). Ways to prevent and reduce obesity are numerous and should be enacted in the home, at school, in the media, and at a governmental level to greatly enhance the quality of life of America's youth.

Starting at home, parents can make choices to prevent and reduce childhood obesity (Epstein, Gordy, Raynor, Beddome, Kilanowski, & Palu, 2012). By providing foods that fit the MyPlate recommendations and are fresh and not processed parents can ensure their children are

receiving all of the nutrients they need. Providing a diet that is high in fruits and vegetables and low in added sugars and unhealthy fats can prevent and reduce childhood obesity (Epstein et al., 2012). Educating their children on the importance of nutrition is also key and can be done as early as the children can understand (Shariff, Bukhari, Othman, Hashim, Ismail, Jamil, Kasim, et. al, 2012). According to Oliver (2011) many school age children are unable to identify fruits or vegetables in their natural state. By cooking with their children, parents are also teaching their children what kinds of choices to make and what healthy foods look like.

A recommendation to increase active time from *Let's Move* (2014) encourage parents and families to create a set time where the family participates in an activity together. The program suggests activities such as tag, catch, riding a bike, etc. By incorporating activity into the family routine parents can also ensure their children are active.

School is another place that children spend a bulk of their time at and can encounter those with a large influence on their life and health habits. To promote healthy behaviors the school should provide more opportunities for physical activity and healthy food options as well as nutrition education (Moran, 1999). Changes to school lunch options and snacks in vending machines through the Healthy Hunger-Free Kids Act are steps in the right direction (Healthy Hunger-Free Kids, 2014). By removing the candy and pop and replacing these with healthier options the temptation has been taken away from the kids. This policy also require schools to provide healthy and fresh fruits and vegetables, enhancing the nutrition children receive while at school.

The media is a powerful motivator in personal decisions and preferences. While advertisements portraying unhealthy food in delicious or attractive ways will always be present, this does not mean that the media cannot be a powerful tool to motivate children to make healthy

decisions. Gollust, Niederdeppe, and Barry (2013) identified ways that media messages affected public opinions of obesity by framing their consequences. These authors suggested that framing consequences might be a more effective tool to use on the parents than on the children themselves, but if the consequences are portrayed in an easily accessible media outlet, then the media can be used as an educational tool for parents to be made aware of the outcomes of childhood obesity. Another way to use the media can be used to promote healthy choices is to appeal directly to the children. If the framing of consequences can be effective in educating the parents, then finding an outlet to frame these consequences could be used to educate children through the media (Gollust et al., 2013).

Programs that encourage healthy lifestyles and promote physical activity are becoming increasingly common. First Lady Michelle Obama spearheaded a program called *Let's Move*. The program is focused on creating a healthy start for children, empowering parents and caregivers, providing healthy food in schools, improving access to healthy, affordable foods, and increasing physical activity. The program receives funding through partnering up with companies such as WalMart or the National School Lunch Program and is setting an influence while providing information and inspiration to adopt a healthier lifestyle (About Let's Move, 2014).

Another program that is targeted toward children is Fuel Up to Play 60 that encourages kids to make their own healthy choices at school or in their daily life and in return rewards them with tickets or programs to encourage them to keep up with their healthy habits (Fuel Up to Play 60, 2014). Programs such as these motivate both the public and children to take responsibility for their health and their choices.

School lunches and regulations about snacks in school have been changed through policy.

The Healthy Hunger-Free Kids act, enacted in July of this year, requires schools to eliminate unhealthy options if the schools wish to receive funding (Healthy Hunger-Free Kids, 2014). This mode of prevention and reduction deals directly with the school or stores that provide to children.

Recommendations

Based on the research found for this article, the researcher can make the following recommendations on ways to prevent and reduce childhood obesity

According to Epstein et al., (2012) modifying intake is the most important and effective way to decrease total calories consumed to prevent or reduce childhood obesity. A study that followed 30 families, each with at least one obese child between 6 and 11 years of age, for one year demonstrated that those families who used a parent focused approach to increasing fruit and vegetable intake and decreasing fat and sugar intake in the family diets. The children were rewarded with positive reinforcement and stickers that could earn them prizes, not food (Epstein et al., 2012). This study demonstrates that parents should take action and implement family wide dietary changes based on the MyPlate example and decrease the amounts of fat and sugar in their diets and increase the consumption of fruits and vegetables. For young children a reward system can be implemented that is not based on food. The families in this study gave the children stickers for each time a healthy choice was made and after a certain amount of time the stickers could be redeemed for a prize. A prize could be a trip to the zoo or anything that promotes healthy activities and does not use food as a reward.

Nutrition education provided at multiple levels and time points is crucial to help children establish health habits that last a lifetime (James et al., 2013). Prenatal classes should include information on the benefits of breastfeeding. Parenting classes could provide information about

when to introduce foods and what kinds of foods to give to infants. Through this knowledge a framework would be set for healthy and well nourished children that can continue on with healthy habits. Nutrition education should start in elementary school to lay a foundation that can be built upon each year. Shariff et. al. (2012) demonstrated that nutrition education is very effective in elementary school aged children. In this study nutrition education was provided for only 6 weeks and after this the children made healthier decisions and showed an increase in knowledge as well as an improvement in attitudes toward healthy eating. If only 6 weeks of nutrition education can cause improvements in attitude and knowledge about nutrition, then it is expected that providing recurring education yearly would reinforce and expand this knowledge.

Increasing the amount of time allowed for physical activity in school should also be implemented (Moran, 1999). Elementary aged students should be allowed recess every day for 60 minutes to ensure that they are receiving the minimum amount of activity recommended (Physical Activity Guidelines, 2008). This would also allow them to socialize more and form healthy habits for adulthood. Physical education should be mandatory each year for students at all grade levels. If children are only required to take PE for a set amount of semesters, then physical education may not be provided each year to the student. This does not promote healthy behaviors and does not allow children and adolescents enough time during the day to be active. Physical education being a required class each year would increase the amount of time these children spent active.

The Healthy-Hunger Free Kids Act is a step in the right direction as far as improving the quality of nutrition provided at schools. By ensuring that these kids get fresh fruits and vegetables and providing assistance to those that may not be able to afford lunch at school, a positive change is being made (Health Hunger-Free Kids, 2014).

In Appendix D.1, D.2, and D.3 the researcher provides an example of an elementary school lunch menu taken from the Muncie Community Schools Website and a breakdown of one meal. This meal is then compared to the MyPlate recommendations. This researcher then provides a healthier option that better fits the MyPlate recommendations of half of the plate made up of fruits and vegetables, one fourth of the plate whole grains, and the last fourth lean protein with a glass of milk or other serving of dairy (MyPlate, 2014).

Conclusion

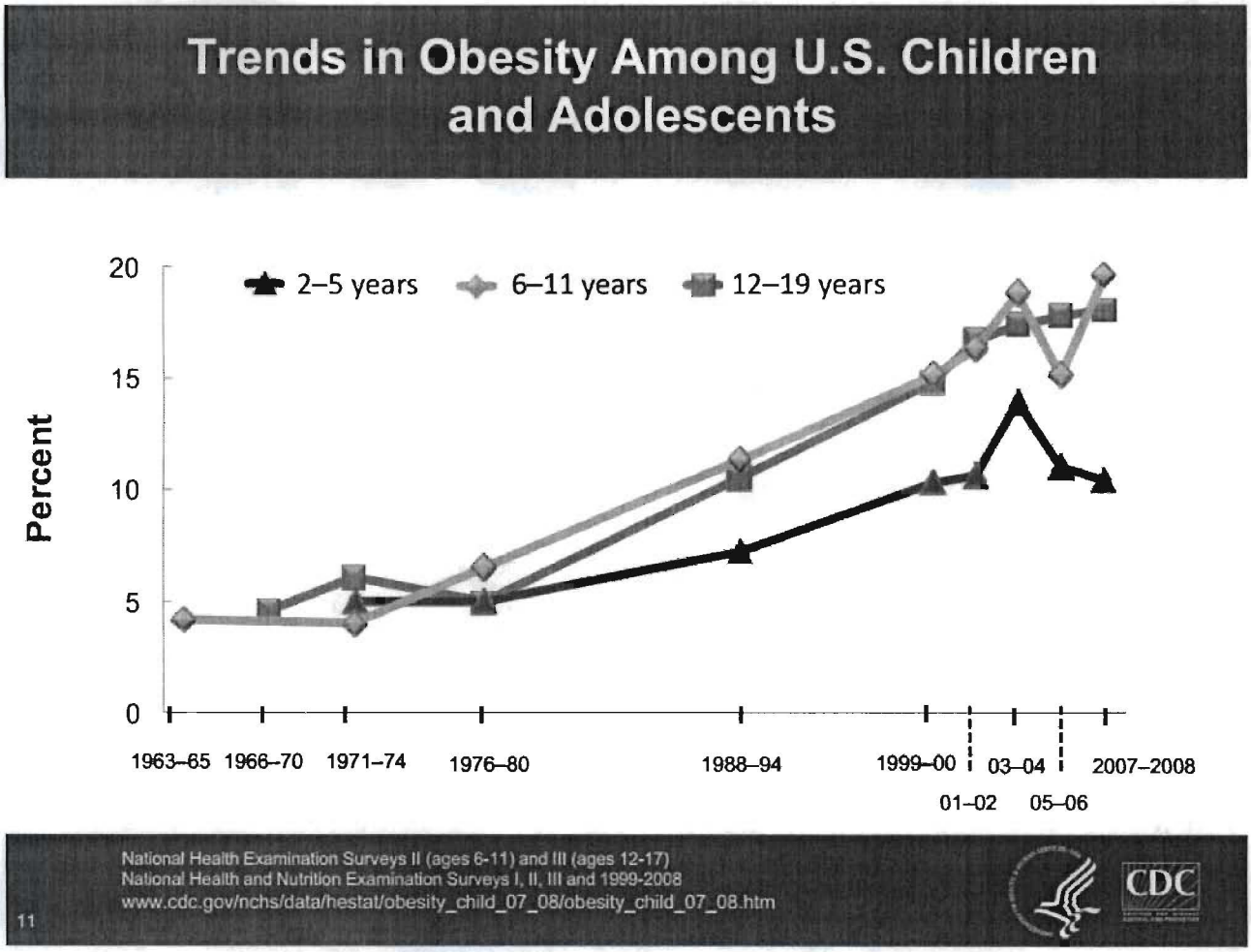
The growing problem of childhood obesity is a serious issue that is increasing in prevalence at an alarming rate. With effects on physical health, life expectancy and psychosocial well-being the importance of addressing this issue cannot be overstated. Through information presented regarding statistics, causes, and effects of childhood obesity the reader has hopefully gained further insight into why childhood obesity is a topic that many policy makers are passionate about.

Without prompt and radical action the crisis can continue to increase and cause this generation of children to live shorter lives with more comorbidities than their parents. Actions need to be taken in the home, the schools, the media, and at a governmental level to implement change and address childhood obesity. The best cure for this epidemic is prevention. By instilling healthy habits in American youth these diseases and disorders can be prevented. Reduction is the next best thing. With drastic changes to lifestyle and habits children already suffering from obesity can return to a healthy BMI and avoid serious permanent health problems. These changes do not come from the children themselves but from those in positions of power and influence such as parents, teachers, policy makers, and school board members. Through

change to the health status of American children and providing education we can ensure that the future generation will be capable of making decisions that promote health and wellness.

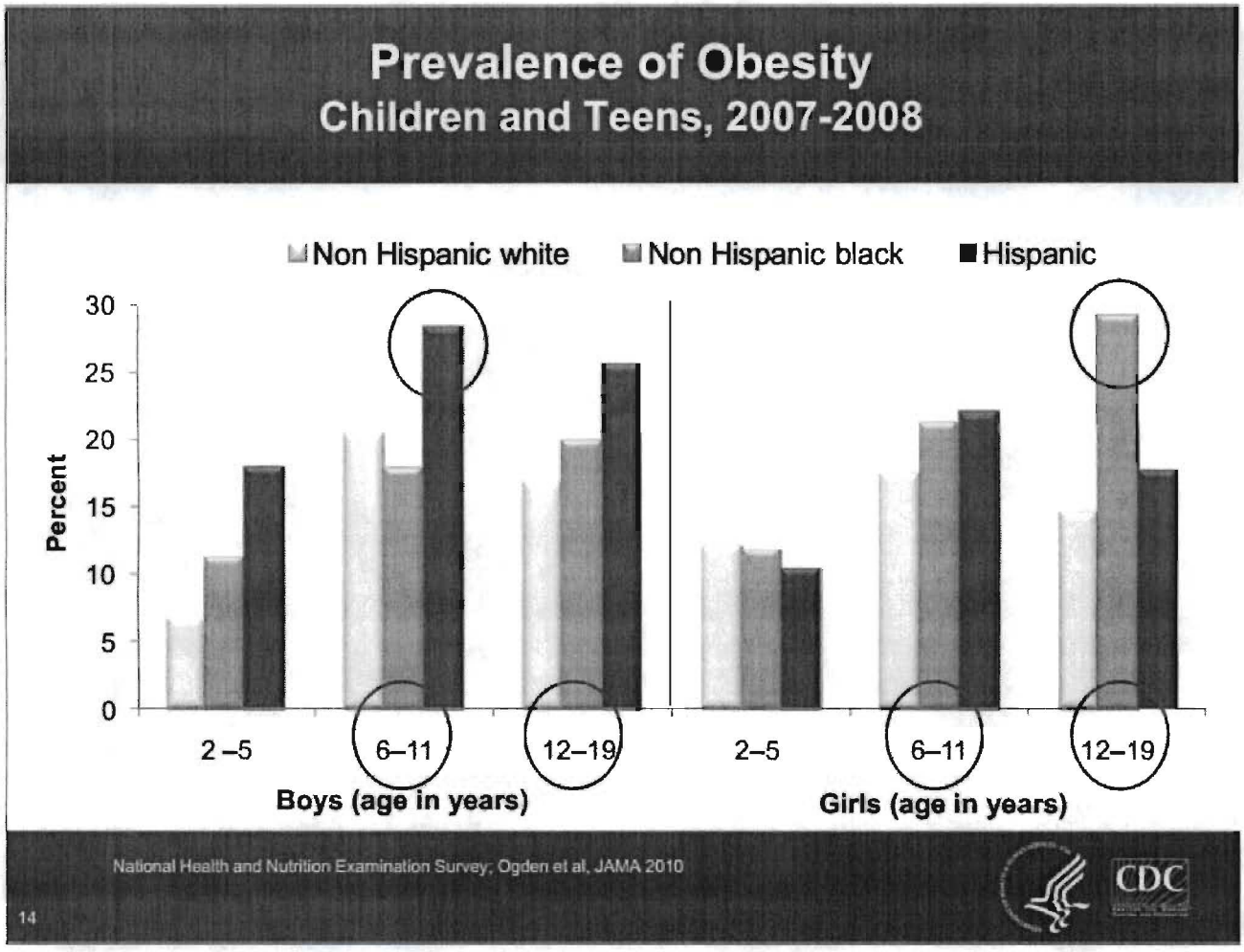
Appendix A.1

History of Trends in Obesity Ages 2 to 19 years from 1963 to 2008, (Ogden, 2008)



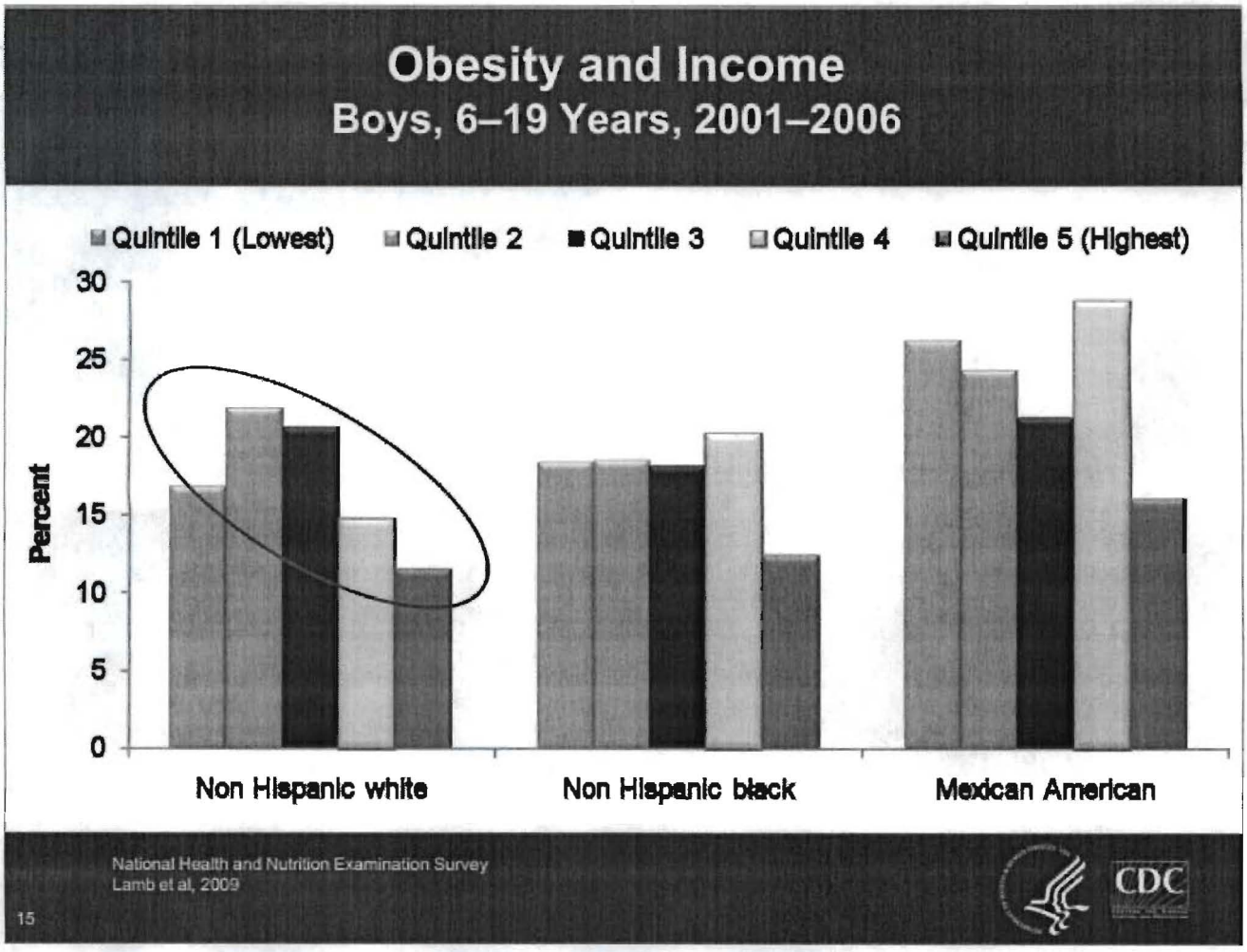
Appendix B.1

Prevalence of Obesity related to Ethnicity, (Ogden, 2008)



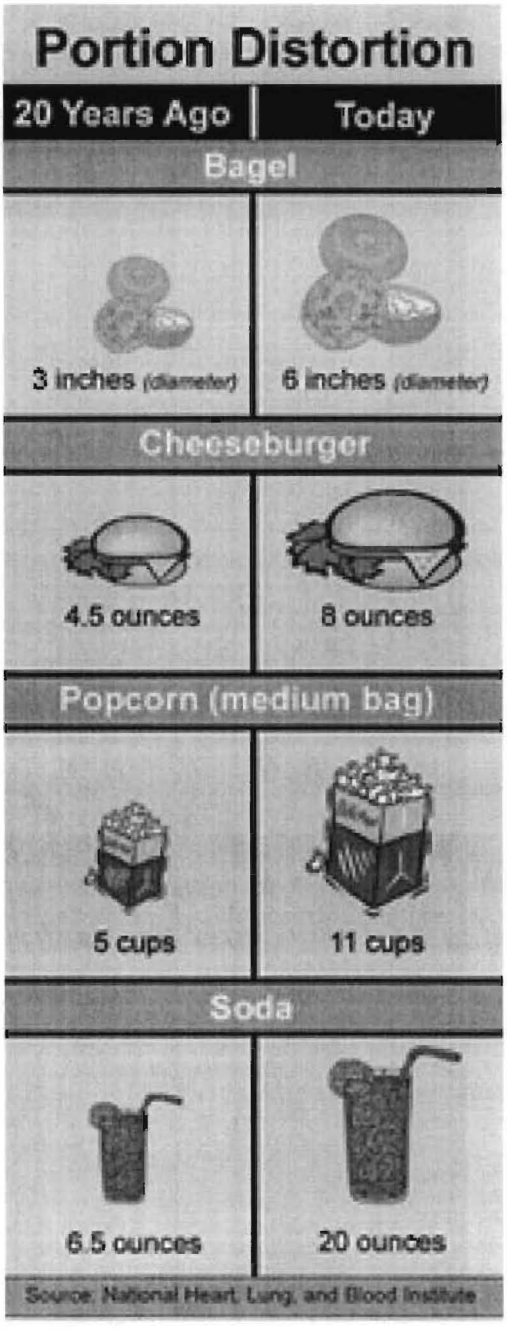
Appendix B.2

Prevalence of Obesity related to Socioeconomic Status, (Ogden, 2008)



Appendix C.1

Illustration of Portion Size Increase over last 20 years, (National Heart, Lung, and Blood Institute, 2013)



Appendix D.1

August 2014 Muncie Community School Lunch Menu

Lunch

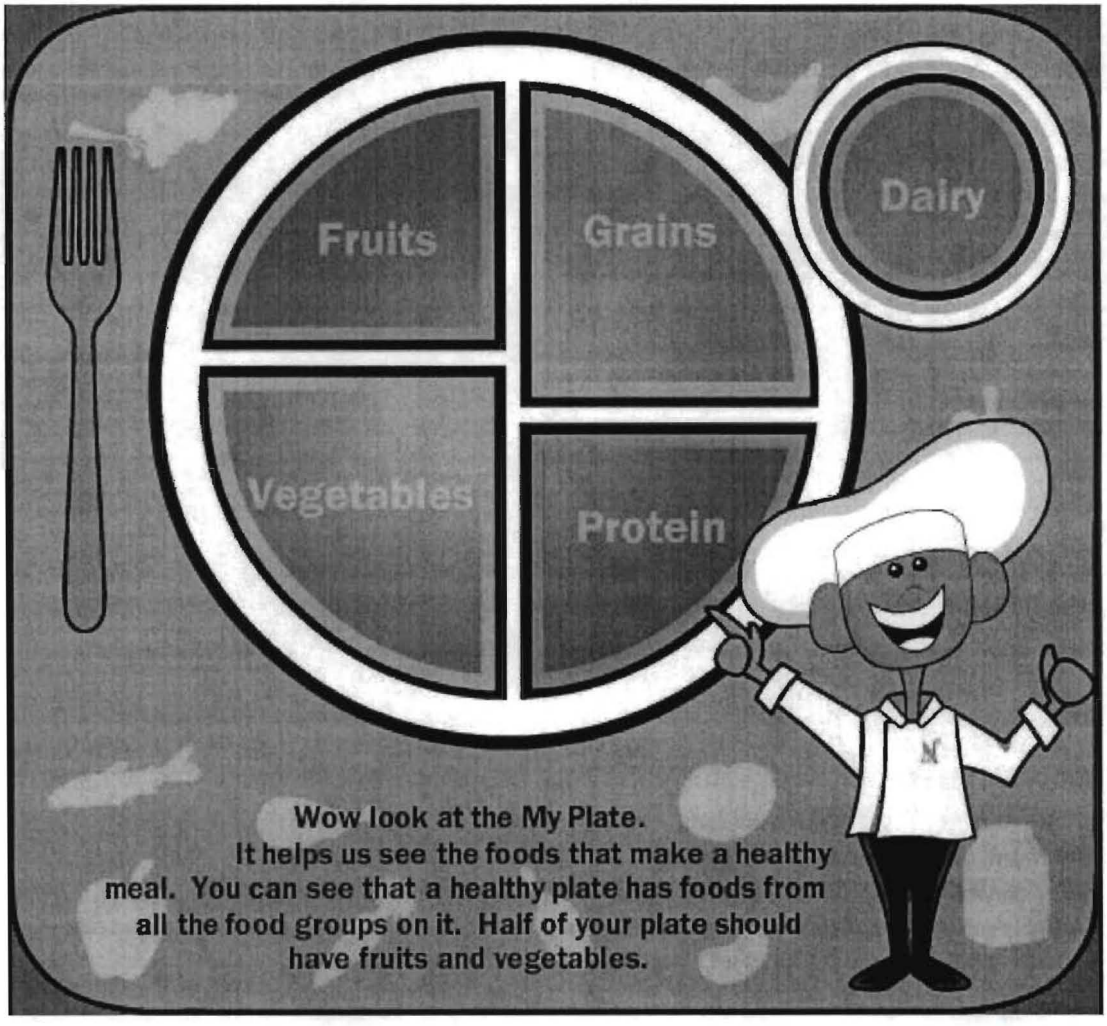
August 2014

Monday	Tuesday	Wednesday	Thursday	Friday
		13 Hot Dog on Bun Whipped Potatoes Green Beans Chilled Peaches Mustard, Ketchup & Relish Milk	14 Pork Chop Patty Oven Fries Steamed Carrots Chilled Pears Bread Ketchup Milk	15 Cheese Pizza Steamed Broccoli Chilled Pineapple Milk
18 Macaroni & Cheese Steamed Broccoli Fresh Fruit Bread w/Margarine Milk	19 Pork Rib Patty on Bun Peas Steamed Carrots Mandarin Oranges Milk	20 Chicken Nuggets w/ **BBQ SAUCE** Whipped Potatoes Green Beans Lunch Bunch Grapes Milk	21 Hamburger on Bun Baked Beans Steamed Mixed Vegetables Chilled Pineapple Lettuce, Tomato, Mustard, Ketchup & Pickles Milk	22 Pepperoni Pizza Baked Sweet Potato Fries Fresh Fruit Milk
25 Chili Breadstick w/Margarine Corn Chilled Pears Milk	26 Corn Dog Oven Fries Peas Orange Mustard & Ketchup Milk	27 Chicken Sticks w/BBQ Dipping Sauce Baked Beans Steamed Carrots Chilled Peaches Bread w/Margarine Milk	28 Toasted Cheese Sandwich Steamed Broccoli Mandarin Oranges Milk	29 Pepperoni Pizza Green Beans Chilled Applesauce Milk

Appendix D.2

MyPlate Recommendations

www.MyPlate.gove



Appendix D.3

Breakdown of School Lunch and New Proposed Menu

This researcher examined the menu from Monday August 18th and Friday August 22nd to see how this lunch compares to the MyPlate guidelines. These meals were chosen because they appeared to have they lacked entire food groups and were the least balanced at first glance.

Monday August 18

Macaroni & Cheese

Steamed Broccoli

Fresh Fruit

Bread with Margarine

Milk

- Grains: Half of the plate is grains, and none of them are whole grains.
- Protein: No lean protein source present.
- Fruit: One serving present.
- Vegetables: One serving present.
- Dairy: There is one serving of dairy present, although the option to choice a flavored milk with added sugar is still present.
- Other: Most margarine contains some saturated fats.

This menu does have half of the plate as fruits and vegetables, but the other half is grains and none of them are whole grains. No protein source is present, and there is a serving of dairy but the option of a chocolate milk is still available. There is also a source of saturated fat on the menu.

Revised Menu

Turkey Sandwich on Whole grain wheat bread with mustard, tomato, lettuce, and Swiss cheese

Fresh fruit

Carrot sticks and celery sticks or steamed broccoli

Low fat yogurt

Water

This revised menu allows for a serving of lean protein, a serving of whole grains in the sandwich with low fat healthy options for condiments. Fresh fruit and fresh vegetables are available with a steamed option as well. The dairy is present in the yogurt with the beverage option being water to keep the students hydrated.

Friday August 22

Pepperoni Pizza

Baked Sweet Potato

Fries

Fresh Fruit

Milk

- Grains: Three option on this menu are starches or grains
- Protein: No lean protein option
- Fruit: A fresh fruit serving is available
- Vegetable: No vegetable option
- Dairy: Dairy option available in the cheese on pizza and milk

This menu does not have half the plate as fruits and vegetables. Three fifths of the options are starches or grains with no protein option or vegetable available. A dairy option is present.

Revised Menu

Cheese Pizza

Salad

Fresh Fruit

Cottage Cheese

Water

The revised menu has the grain option of the pizza, half of the plate fruits and vegetables from the salad and fruit, and both protein and dairy available in the cottage cheese with water to drink.

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